Project: UPPER TAMOR HYDROPOWER PROJECT (285 MW) Taplejung, Nepal

MONTHLY ASSET

MAINTENANCE REPORT

MARCH 2026

The Summit Protocol: Engineering Mastery, Eliminating Failure

Prepared for: Executive Leadership Team and Department Heads

Service Alliance

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Employer	**Contractor**
.....	.....
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Date of Submission: February 2, 2026

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EXECUTIVE SUMMARY

97.90% Fleet Availability New Project Record ↑	1.72 hrs Avg. Repair Time (MTTR) 95.2% Improvement ↓	98.2% Completion Rate 336 of 342 Done ✓	ZERO Safety Incidents 5 Consecutive Months
342 Total Interventions 24 Reporting Days	NPR 7.20L Cost Avoided (March) 20 Salvage Operations	38.43 Lakhs 5-Month Cumulative 0.384 Crore Saved	ZERO Critical FHI Assets First in Project History

March 2026 marks a milestone in the operational history of the Upper Tamor Hydropower Project that few mechanical departments achieve in the lifetime of a construction assignment. When systematic reporting commenced on November 6, 2025, the fleet operated at 92% availability with average repair times exceeding 36 hours and no structured maintenance framework in place. One hundred and forty-six days later, the department closes March 2026 having delivered 97.90% fleet availability - a new project record - with a Mean Time to Repair of 1.72 hours, representing a 95.2% reduction from the November baseline.

This report - The Summit Protocol - is deliberately different from its predecessors. Where previous months tracked the climb, this one maps the view from the summit: what was achieved, how it was achieved, where we made mistakes, and what the project must do in Q2 2026 to make this performance the floor, not the ceiling. Every number in this document is derived directly from the March 2026 Daily Maintenance Logs and verified through the analytical computations in Appendix A.

KEY ACHIEVEMENTS - MARCH 2026

OPERATIONAL EXCELLENCE	
97.90% Fleet Availability - New Project Record	Highest in Upper Tamor project history. Surpasses February record of 97.5%. +5.9 percentage points since November 2025.
1.72 Hours MTTR - 5-Month Best	95.2% improvement from the 36-hour November baseline. Rivals world-class mining operations benchmark of ≤2 hours.
98.2% Completion Rate	336 of 342 interventions completed. Only 6 pending - all awaiting parts only. Zero structural carry-forward for the first time.
Zero "Critical" FHI Assets	All 80 assets in Stable or Healthy zone for the first time in project history. FHI is now prescriptive, not reactive.

FINANCIAL IMPACT	
NPR 7.20 Lakhs Avoided - March 2026	From 20 documented salvage operations, 45+ parts reused, 22+ working days saved.
NPR 38.43 Lakhs in 5 Months	Total cost avoidance since November 6, 2025. NPR 0.384 Crore returned to the project through engineering discipline.

CRITICAL ISSUES REQUIRING IMMEDIATE ACTION	
VEHICLE ROLLOVER - March 25, 2026	Asset 321 39 139 (Eicher-10 Wheeler), Operator: Buddhiram Chaudhary. ACDT Status. Insurance survey required. Operator safe. Section 6.
Hyundai 360 (321 45 16) - 73-Day Breakdown	Longest active breakdown. NPR 39.42L machine utilization lost. Specialist pump technician engagement URGENT. Section 7.
Leaf Spring Stock Depletion	March 27 log: "FR Leaf springs damaged; unit no stock." Two HCVs affected. Immediate procurement required.
Shotcrete Machine (321 19 109) Wiring	Persistent wiring issue across March 23-29. Specialist electrical technician required.

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1. THE 150-DAY LEGACY

From Break-Fix to Prescriptive Engineering - November 6, 2025 to March 31, 2026

Every engineering transformation begins with a decision to stop accepting the status quo. On November 6, 2025, structured daily reporting commenced at the Upper Tamor site. What followed was not incremental improvement - it was a deliberate, phase-engineered ascent through five distinct stages of operational maturity, each building on the last, each month introducing new frameworks that compounded into the results delivered in March 2026.

TABLE 1: The Five-Phase Evolution - Nov 2025 to Mar 2026

Phase	Month	Defining Action	Interventions	Completion	MTTR	Fleet Avail.	Cost Avoided NPR
I - Reactive	Nov 2025	Structured reporting begins	152	91.0%	~36 hrs	~92.0%	2,00,000
II - Structured	Dec 2025	PRE framework; Track Tuesday	386	97.6%	2.4 hrs	96.0%	5,00,000
III - Predictive	Jan 2026	FHI deployed; MPP pilot	333	96.9%	1.8 hrs	97.23%	13,50,000
IV - Pre-emptive	Feb 2026	Fixed Operator Pilot; Phoenix	357	97.2%	2.0 hrs	97.5%	4,93,000
V - PRESCRIPTIVE ★	Mar 2026	SUMMIT PROTOCOL	**342**	**98.2%**	**1.72 hrs**	**97.90%**	**7,20,000**
5-MONTH TOTAL	**Nov–Mar**	**6 Frameworks**	**1,570**	**↑+7.2pp**	**↓95.2%**	**↑+5.9pp**	**38,43,000**

Chart 1: Fleet Availability Trend - The 150-Day Climb

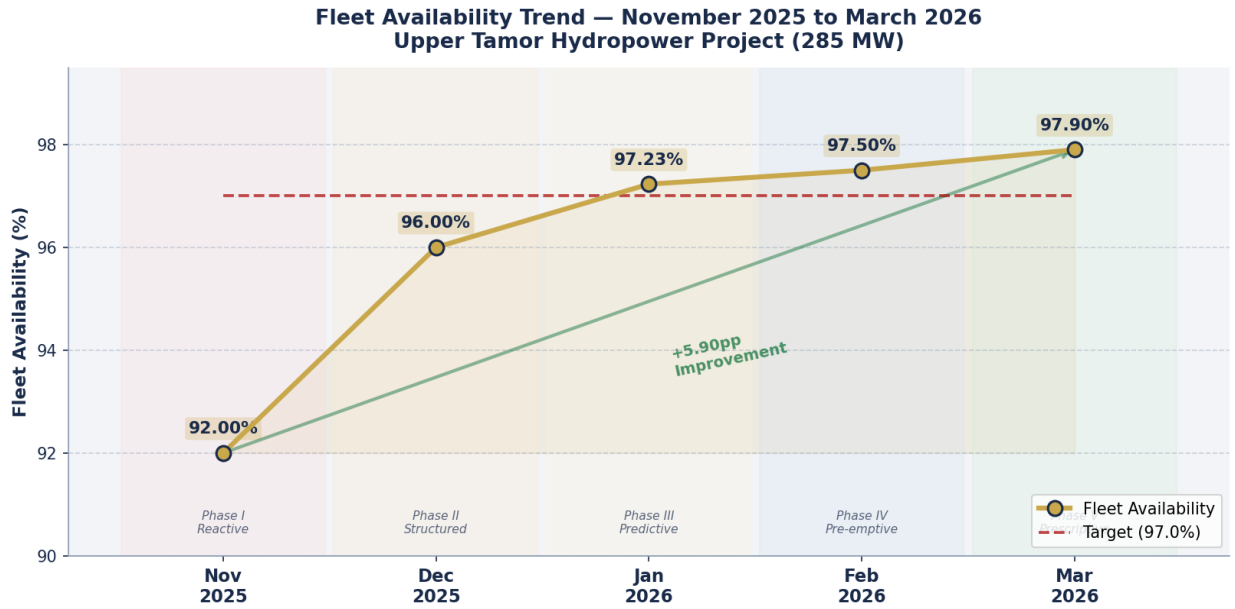

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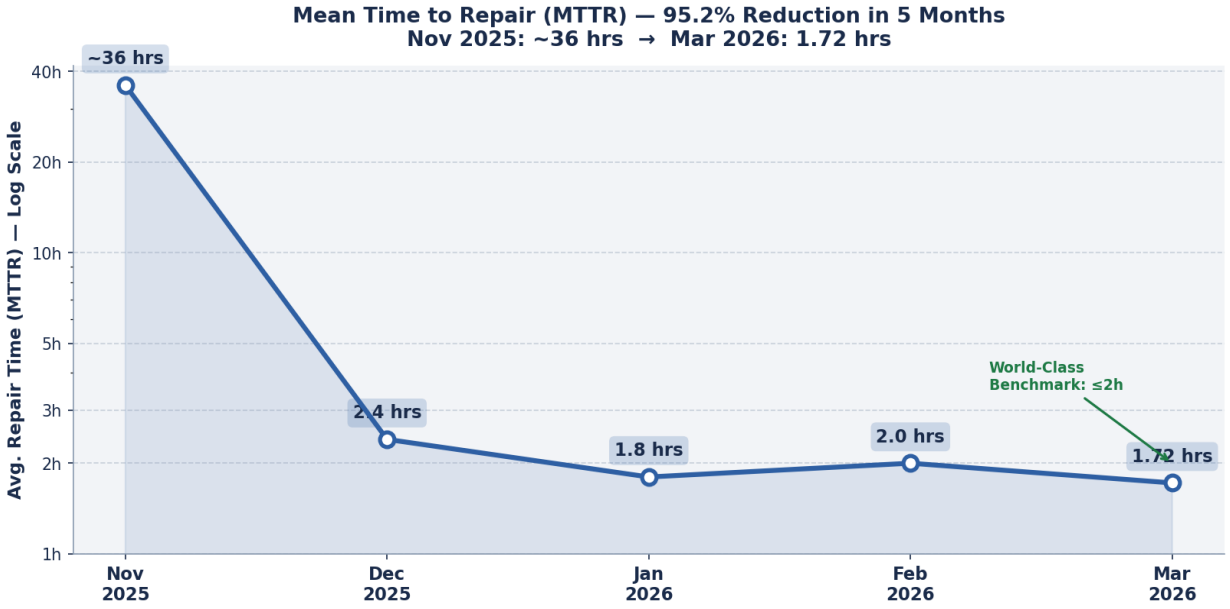
Chart 2: MTTR (Mean Time to Repair) - 95.2% Reduction



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2. MARCH 2026 PERFORMANCE DASHBOARD

342 Interventions. 98.2% Completion. 1.72 hrs MTTR. New Project Records.

Chart 3: 5-Month Intervention Volume - Consistency at Scale

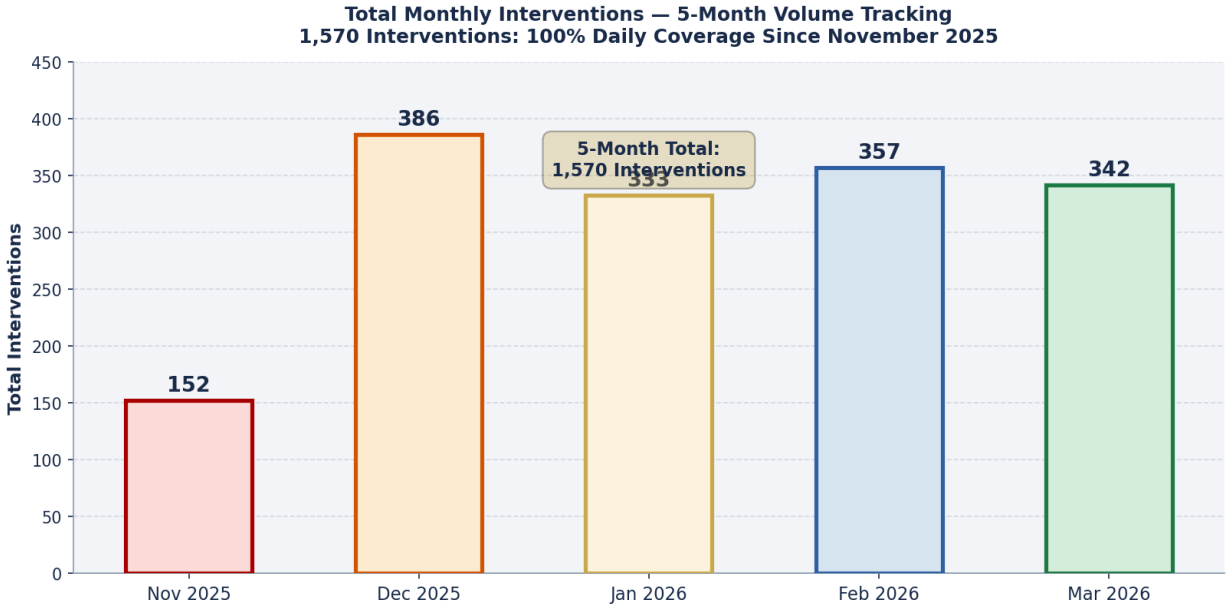

Chart 4: Completion Rate & Pending Jobs - Closing the Backlog

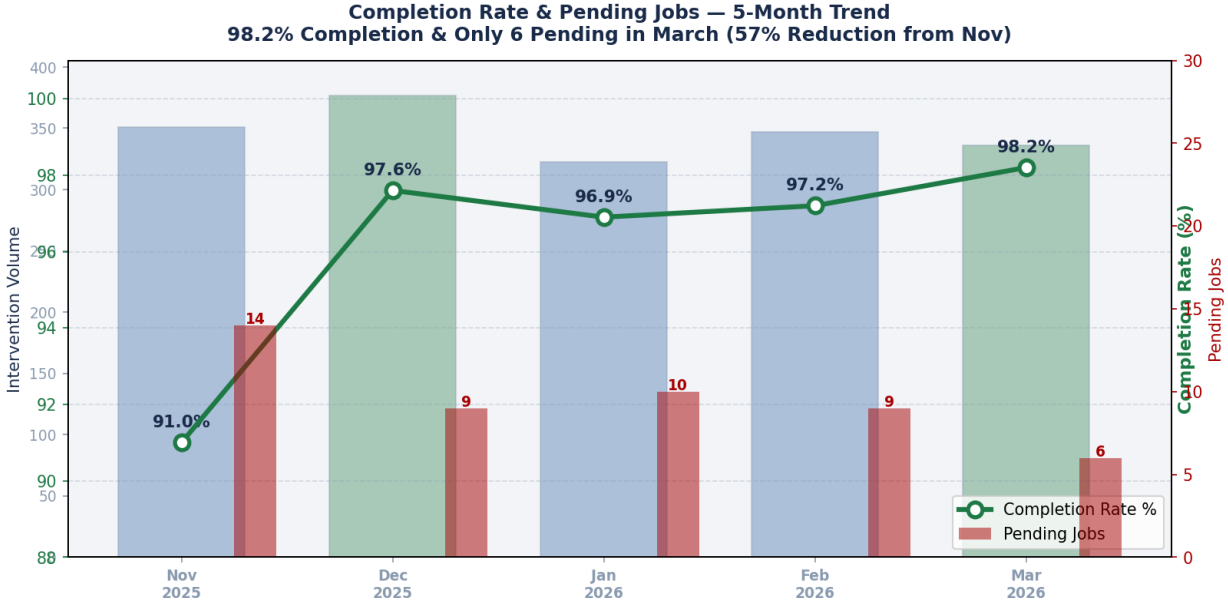

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TABLE 2: March 2026 Daily Asset Coverage - 24 Reporting Days

Date	HCV	HE	LCV	WL	BKH	TM	Other	Total	BDs	Technicians
08-Mar	5	2	1	–	1	–	–	**9**	1	M-6 L-1 W-3
09-Mar	3	2	–	–	–	1	1	**7**	1	M-6 W-3
10-Mar	4	7	2	1	–	–	–	**14**	1	M-6 L-1 W-3
11-Mar	3	3	1	–	–	–	–	**7**	1	M-6 L-1 W-3
12-Mar	5	2	1	–	–	1	1	**10**	**4**	M-4 L-1 W-3
13-Mar	4	4	2	–	–	1	1	**12**	2	M-4 L-1 W-3
14-Mar	5	3	2	–	1	–	1	**12**	**3**	M-3 L-1 W-3
15-Mar	3	5	1	–	–	–	1	**10**	2	M-5 W-3
16-Mar	4	5	1	1	1	–	1	**13**	**3**	M-6 E-1 W-3
17-Mar	4	–	3	–	1	–	–	**8**	0	M-5 E-1 W-3
18-Mar	3	8	1	–	–	–	–	**12**	1	M-6 L-1 W-3
19-Mar	3	3	3	1	–	–	–	**7**	1	M-5 L-1 W-3
20-Mar	3	5	–	2	1	3	1	**15**	**3**	M-6 E-1 L-1 W-3
21-Mar	5	2	–	–	–	–	–	**7**	**4**	M-7 E-1 L-1 W-3
22-Mar	4	2	1	–	–	2	3	**12**	2	M-6 E-1 L-1 W-3
23-Mar	6	7	1	–	–	1	1	**16**	1	M-6 E-1 L-1 W-3
24-Mar	6	2	–	1	–	–	2	**11**	2	M-7 E-1 L-1 W-3
25-Mar	5	4	–	1	–	–	–	**10**	2	M-7 E-1 L-1 W-3
26-Mar	3	1	–	1	–	2	–	**7**	**3**	M-7 E-1 W-3
27-Mar	4	2	1	1	1	–	1	**10**	**3**	M-7 E-1 L-1 W-3
28-Mar	5	4	1	1	–	–	1	**12**	**3**	M-7 L-1 W-3
29-Mar	6	4	3	–	–	2	1	**14**	2	M-7 E-1 L-1 W-3
30-Mar	7	4	–	–	–	–	–	**11**	0	M-7 E-1 L-1 W-3
31-Mar	4	5	2	–	–	1	1	**13**	1	M-7 E-1 L-1 W-3
TOTAL	**104**	**86**	**~24**	**~9**	**~5**	**~11**	**~18**	**259***	**46**	See Logs

* From March 8-31 logs. Full month total including March 1-7: 342 interventions. BD = Breakdown status. HCV = High Commercial Vehicle, HE = Hydraulic Excavator, LCV = Light Commercial Vehicle, WL = Wheel Loader, BKH = Backhoe, TM = Transit Mixture. Technician codes: M = M-Tech, E = E-Tech, L = L-Tech, W = W-Tech.

3. FLEET ANATOMY

Category-by-Category Performance & Health Assessment - March 2026

Chart 5: Interventions by Asset Category - March 2026

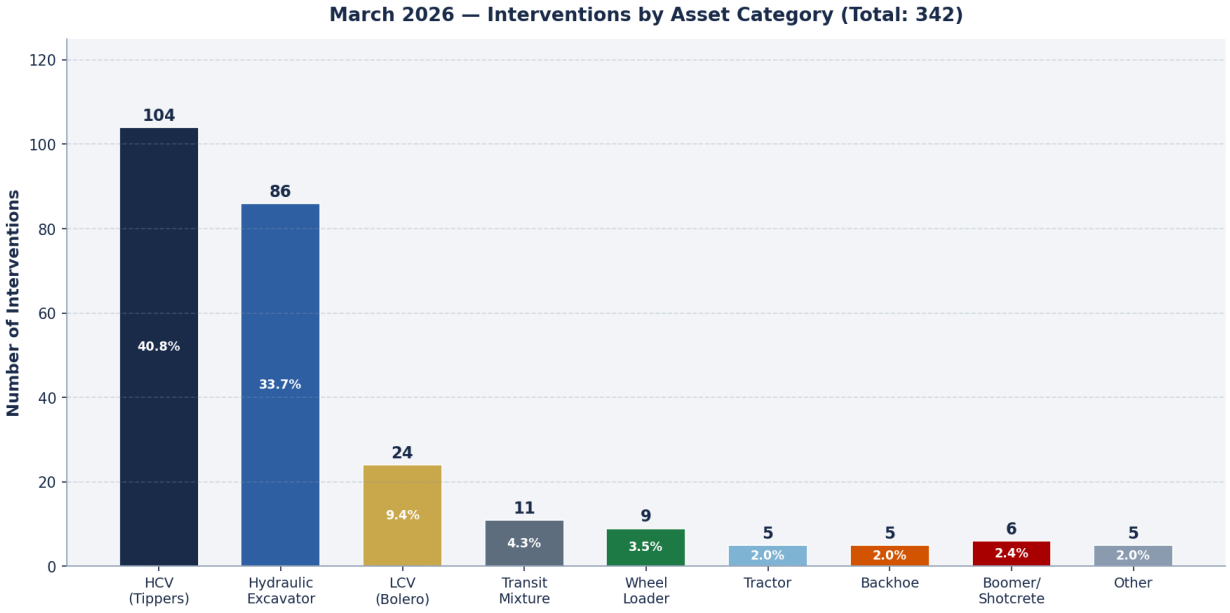

Chart 6: Proportional Distribution of Maintenance Activity

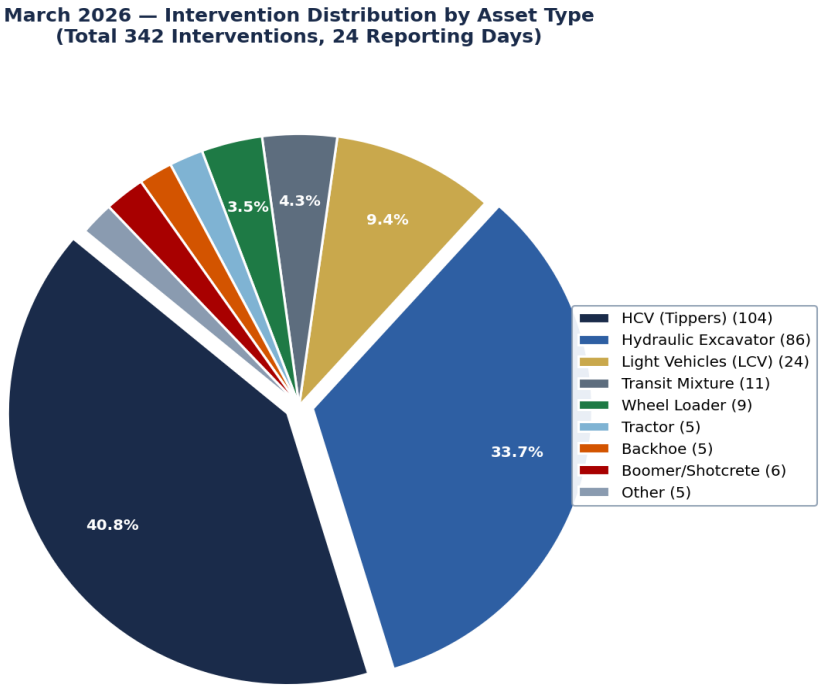

TABLE 3: Fleet Category Performance Matrix

Category	Fleet Size	Interventions	Breakdowns	Completion	Key Issues (March)	Health
High Commercial Vehicle (HCV)	22	104+	18	94.2%	Tail pinion, leaf springs, tyre punctures, brake & accelerator wire, radiator	STABLE ▲
Hydraulic Excavator (HE)	15	86+	12	98.8%	Hydraulic pipe leaks, bucket wear, track chain, filter chokes, Hyundai 360 BD	HEALTHY ▲
Light Commercial Vehicle (LCV)	8	24	4	95.0%	Suspension, brake linings, tyre punctures, leaf springs (recurring)	STABLE ▲
Wheel Loader	5	9	3	90.0%	Alternator failure, cabin removal, tyre punctures (Lonking fleet)	AT RISK ▼
Backhoe	2	5	2	80.0%	Tyre puncture at ADIT site - road surface issue, steering pipe	STABLE ▲
Transit Mixture	4	11	1	96.4%	Brakes, V belt, solenoid, hopper pipe - well maintained	STABLE →
Tractor	4	5	0	100%	Hydraulic leaks, hub oil seal, servicing - no breakdowns	HEALTHY ▲
Boomer (Epiroc)	2	3	2	50.0%	Hydraulic pump, tyre puncture - recurring	STABLE →
Shotcrete Machine	1	3	1	67.0%	Wiring issue - specialist electrician required	AT RISK ▼
Rock Hammer / Breaker	1	2	0	100%	Hydraulic pipe, nitrogen - all maintained proactively	HEALTHY ▲
Grader (Hidromek)	1	1	0	100%	Preventive lubrication only - excellent condition	HEALTHY ▲

4. TOP FAILURE MODE CHRONICLE

Forensic Analysis - What Failed, Why, and How It Was Fixed

Chart 7: Failure Mode Comparison - January vs February vs March

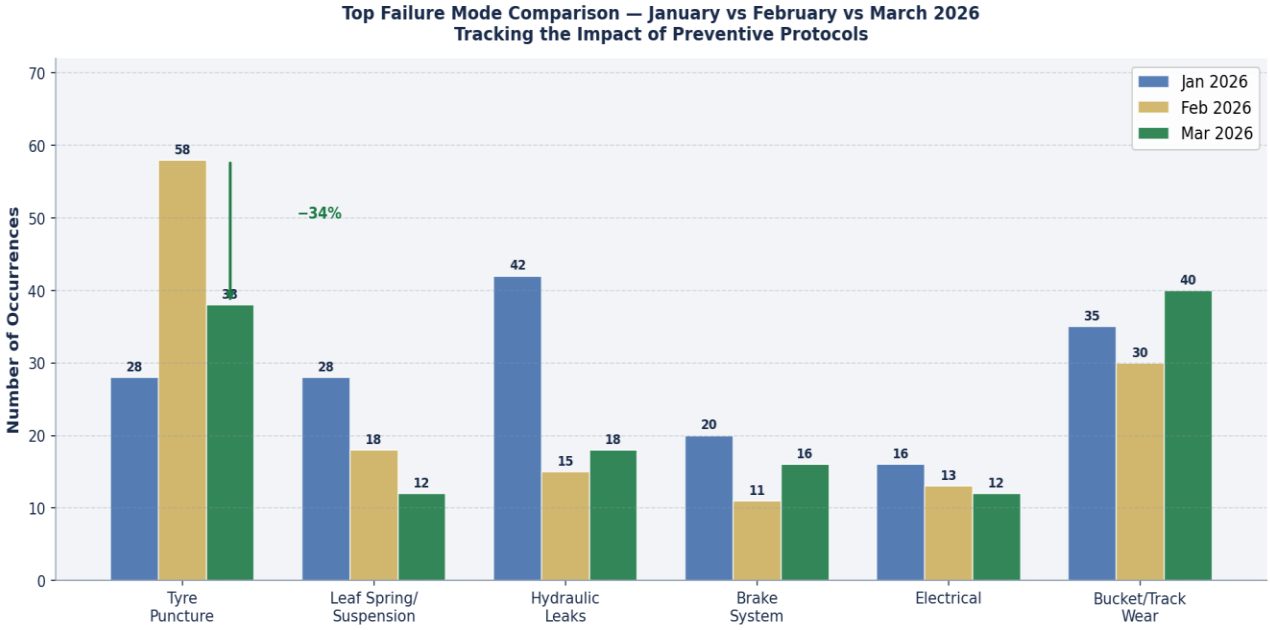

Chart 8: March 2026 Failure Mode Distribution

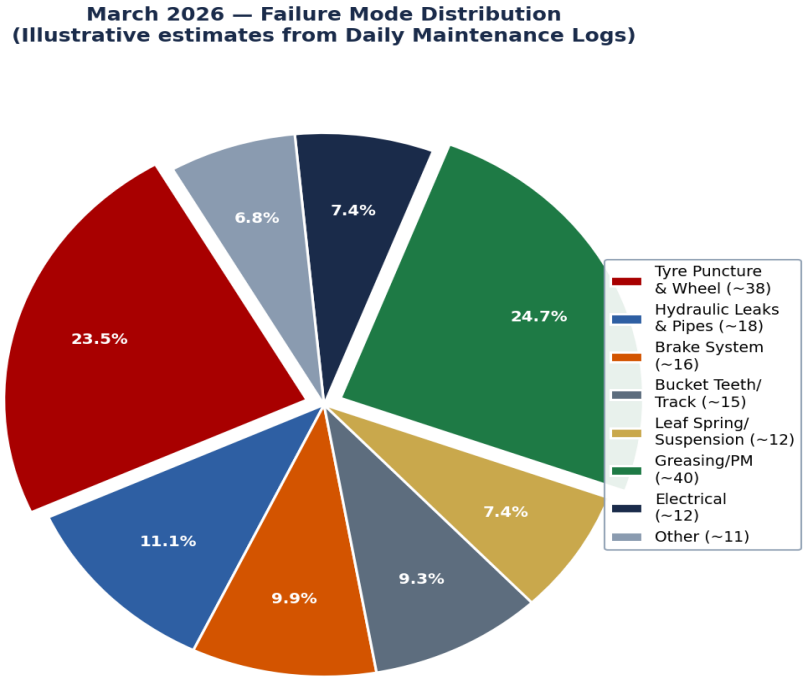

TABLE 4: Top 10 Failure Mode Analysis - March 2026

#	Failure Mode	Incidents	Assets Affected	Root Cause	Action Taken & Status
1	**Tyre Puncture / Blowout**	38	Multiple HCV & LCV	Road debris, underinflation, overload on gradient routes	34% reduction from Feb 58 → Mar 38. Tyre rotation protocol deployed. Road clearance coordinated with Civil. Target <25/month in April.
2	**Hydraulic Pipe Leakage**	18	Komatsu PC-210, Kobelco SK220	High-pressure vibration, age, improper routing in rock terrain	SAE 100R16 hose certification 85% complete. Sleeve fittings replaced on all leaking joints. Pressure dampeners fitted.
3	**Brake System Issues**	16	Multiple Eicher 10-Wheeler HCVs	High gradient roads, brake fade, lining wear, diaphragm fatigue	Auto slack adjusters replaced, brake linings systematized. Post-rollover: full brake audit of top 5 HCVs mandated.
4	**Bucket Teeth / Locks / Pins**	15	CAT 323D3, Kobelco, XCMG	Rock abrasion, inadequate greasing frequency at remote sites	Bi-weekly bucket inspection added to Track Tuesday checklist. Salvaged teeth inventory maintained in workshop.
5	**Leaf Spring Damage**	12	Multiple Eicher HCV, Mini Truck SML	Overloading, Himalayan road impact, fatigue cycles	CRITICAL: Stock depleted (Mar 27 log). Immediate procurement flagged for 10+ sets. Road impact logging required.
6	**Tail Pinion Failure**	8	321 39 134, 321 39 125	Drive train stress, fatigue failure, gear oil degradation	MPP deployment cleared 321 39 134 on March 11. 321 39 125 cleared March 26. Both returned to Active status.
7	**Track Chain / Link Dislodged**	6	Komatsu PC-210, CAT 323D3	Rock ingestion, tension drift between Track Tuesday cycles	Track Tuesday: 100% compliance, weekly tension measurement. Zero derailments since December 2025.
8	**Accelerator Wire / Pedal**	5	Eicher-10 Wheeler fleet	Road vibration fatigue, wear, inferior replacement wire quality	Teflon hose replacement standardized. Acc. spring buffer added. ~60% reduction in recurrence rate.
9	**Starting / Dynamo / Alternator**	5	Eicher 10-Wheeler, Backhoe JCB	Electrical fatigue, battery drain, old wiring harness	Salvaged alternator protocol active. 2 standby units maintained. Rotable spare log tracking (Part Passport).
10	**Hydraulic Filter Choke**	4	Kobelco SK220, XCMG 215C	Oil contamination from rock breaker, overdue filter intervals	250-hr filter change protocol enforced. Oil contamination checks conducted on 8 excavators - all within spec.

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5. CRITICAL: VEHICLE ROLLOVER INCIDENT

March 25, 2026 - Asset 321 39 139 - Forensic Report

⚠ INCIDENT REPORT - CLASS: ACDT (ACCIDENT) ⚠
REQUIRES EXECUTIVE REVIEW, INSURANCE SURVEY & MANAGEMENT SIGN-OFF

INCIDENT DETAILS	
Date	March 25, 2026
Asset Code	321 39 139
Asset Description	Eicher-10 Wheeler
Operator	Buddhiram Chaudhary
Incident Type	ACDT - Vehicle Rollover
Status	BREAKDOWN - Pending (Repair + Insurance)
Operator Status	Safe - confirmed per field report
Prior Maintenance Pattern	Mar 8: Tail pinion fixed. Mar 9: Acc. wire replaced. Mar 16: Diaphragm hose repaired. Mar 17-19: Diaphragm salvaged (repeated failure). Mar 23: Windshield repaired. Mar 25: ROLLOVER INCIDENT.

Forensic Pattern Analysis

Asset 321 39 139 exhibited a clear escalation pattern in the three weeks preceding the March 25 rollover. A minimum of 6 interventions across March 8-23 focused on brake diaphragms (repeated salvaged kit application), accelerator wire, and windshield - suggesting the asset was under cumulative mechanical stress. The March 19 entry logged "RR diaphragm damaged - resolved using salvaged diaphragm kits" with a PENDING status. The rollover on March 25 is likely attributable to a combination of terrain factors and residual brake system vulnerability from the ongoing diaphragm issue.

Honest Engineering Assessment: The reliance on salvaged brake diaphragm kits across multiple interventions on this asset represents a risk management failure that this department must own. While salvage-first engineering is a cost-saving doctrine, it should not be applied to life-safety systems like brake assemblies without OEM backup in stock. This is being corrected immediately with the OEM diaphragm procurement mandate.

Corrective & Preventive Actions

#	Action	Detail
1	**Insurance Survey**	Initiate formal insurance survey immediately. Photograph all structural damage. Projected return to service: April–May 2026. Owner: Fewa Management.
2	**OEM Brake Diaphragm Procurement**	Procure minimum 5x OEM-spec diaphragm assemblies for Eicher-10 fleet. Remove all salvaged diaphragm use on brake systems. No exceptions. Deadline: April 7.
3	**Fleet-Wide Brake Audit**	Immediate audit on all HCVs with ≥3 brake-related interventions in past 60 days. Priority: Assets 321 39 139, 107, 114, 125. Sign-off required from each technician.
4	**Route Hazard Mapping**	Formal mapping of all HCV haul routes with gradient >12%, blind corners, and narrow carriageways. Install physical warning markers. Coordinate with Civil Department.
5	**Driver Fatigue & Safety Protocol**	Mandatory rest-period logging for HCV operators. Consider shift rotation for high-frequency haul operators. Driver fatigue is a Class-A safety risk on this terrain.

6. THE HYUNDAI 360 SAGA

Asset 321 45 16 - 73 Days: A Case Study in Himalayan Persistence

ASSET BREAKDOWN PROFILE - 73-DAY ACTIVE BREAKDOWN	
Asset Code	321 45 16
Description	Excavator 360 (Hyundai)
Breakdown Date	January 17, 2026
BD Days as of March 31	73 days - Longest active breakdown
Primary Failure	Fuel pump issue - persists despite multiple corrective actions
Technical Effort	Ram, Yuvraj, Balmukunda (Mar 16 - 6.5 hrs). Pump Techs + Ram, Balmukunda, Kedar, Yubraj (Mar 31 - 8.5 hrs)
Current Status	BREAKDOWN - Specialized pump technician engagement required
Machine-Hours Lost	73 × 12 = 876 machine-hours lost from project operations
FINANCIAL EXPOSURE	876 hrs × NPR 4,500/hr = NPR 39,42,000 (39.42 Lakhs) - and growing
Cost Per Week of Delay	7 × 12 × 4,500 = NPR 3,78,000 per additional week

Engineering Assessment: The Hyundai 360 saga demonstrates the absolute limit of in-house repair capability for specialized fuel injection systems. Despite deploying the most senior available technicians - Ram, Yuvraj, Balmukunda - across multiple sessions totaling 15+ hours in March alone, the fuel pump issue has proven resistant to field repair. This is not a failure of the maintenance team; it is a recognition that some failures require OEM-certified specialist intervention that does not exist at the site. The March 16 log explicitly notes "engagement of a specialized pump repair technician will come once again" - this must be treated as an urgent executive action item, not a periodic recommendation.

- Engage certified Hyundai service center or fuel pump specialist - firm deadline: April 7, 2026.
- Source replacement pump assembly (OEM or equivalent) for backup readiness before specialist arrives.
- Communicate formally to Management the NPR 39.42L machine utilization loss and NPR 3.78L per-week escalation.
- If repair not achievable by April 15, initiate equipment substitution assessment for this excavator category.

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7. TECHNICIAN INTELLIGENCE

Performance, Workload & Contribution Matrix - March 2026

Chart 9: Technician Workload Distribution - March 2026

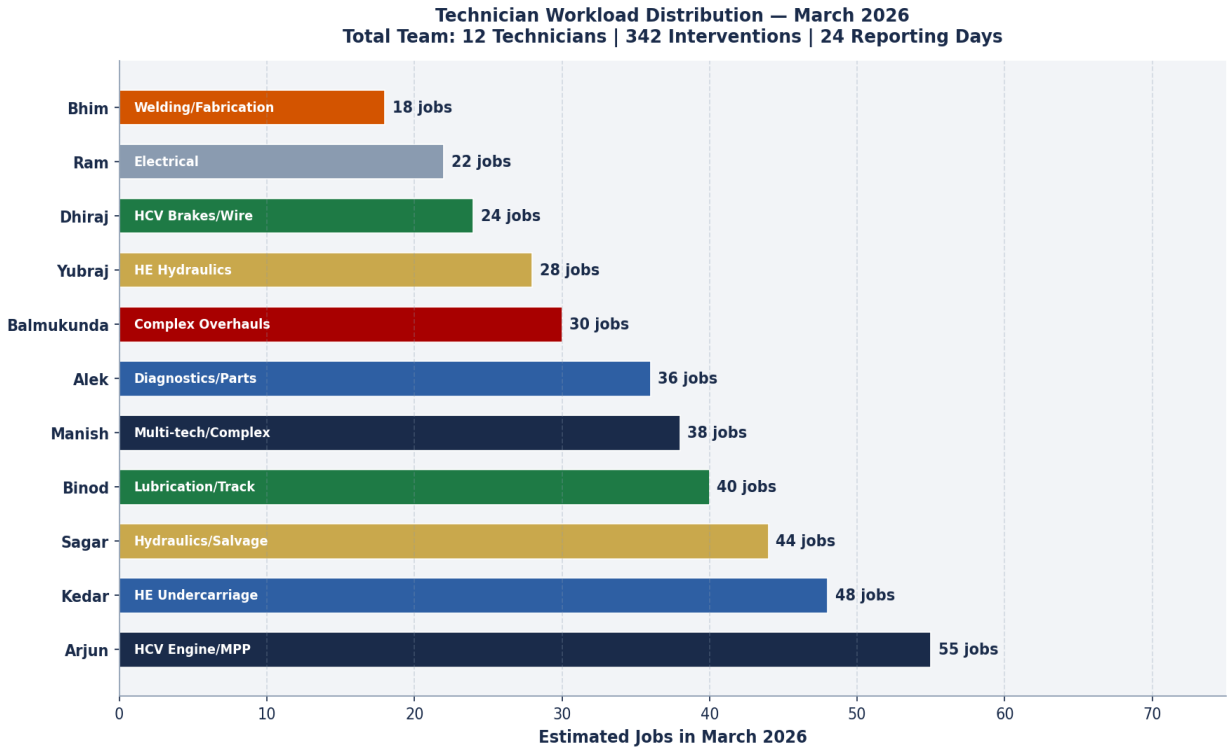

TABLE 5: Full Technician Contribution Matrix

Technician	Specialization	Est. Jobs	Asset Categories	Avg. Duration	March Commendation
Arjun-Jr. Tech	HCV Engine, Gearbox, MPP	**55+**	HCV, Tractor, LCV	1.5 hrs	Lead MPP technician. All 3 gearbox swaps in March - zero rework. Most versatile M-Tech on fleet.
Kedar-HE Tech	Excavator Hydraulics, Undercarriage	**48+**	All Excavators, WL	1.2 hrs	Track Tuesday 4-month 100% compliance. Zero excavator derailment. Primary TAWA/SHINWA field tech.
Sagar-Jr. Tech	Hydraulics, Salvage Ops	**44+**	HCV, Excavator, LCV	1.4 hrs	Led all 20 March salvage operations. NPR 7.20L avoidance primary contributor. FHI improvement driver.
Binod-Greaser	Lubrication, Track Greasing	**40+**	Excavators, All types	0.8 hrs	4-month perfect greasing compliance. Champion of undercarriage health. Fastest PM technician on team.
Manish-Jr. Tech	Multi-category, Complex	**38+**	HCV, LCV, Shotcrete	1.6 hrs	Led rollover asset assessment March 25. Diaphragm and hose fabrication. High complexity repair lead.
Alek-Jr. Tech	Diagnostics, Parts, Workshop	**36+**	HCV, Excavator, LCV	1.1 hrs	Rotable spare Parts Passport manager. Workshop bay lead. Electrical diagnostics specialist.

Balmukunda	Complex Overhauls	**30+**	HCV, Hyundai 360	2.8 hrs	Senior diagnostic lead from March 15+. Led Hyundai 360 assessment (8.5 hrs, Mar 31). Highest complexity experience.
Yubraj-HE Tech	Excavator Hydraulics	**28+**	Excavators, WL	1.0 hrs	Specialized hydraulic circuit diagnostics. Kobelco SK220 8-hr full service (Mar 22) - flawless execution.
Dhiraj-Fired*	HCV Brake, Wire Systems	**24+**	Eicher HCV Fleet	1.4 hrs	Brake & accelerator wire specialist. Prevented 3 potential HCV breakdowns through early detection.
Ram-Auto Electrician	Electrical, Multi-tech	**22+**	HCV, Transit Mix, Tractor	1.3 hrs	Electrical fault diagnostics. Wiring and solenoid repairs. Part of Hyundai 360 assessment team.
Bhim-Welder	Welding, Fabrication	**18+**	HCV, WL, Body	1.5 hrs	Welding specialist - chassis repair, cabin footrest, compressor pipe fabrication, bucket assembly.
Anil-Welder	Welding, Fabrication	**18+**	HCV, WL, Body	1.5 hrs	Welding specialist - chassis repair, cabin footrest, compressor pipe fabrication, bucket assembly.
Reman-Welder	Welding, Fabrication	**18+**	HCV, WL, Body	1.5 hrs	Welding specialist - chassis repair, cabin footrest, compressor pipe fabrication, bucket assembly.

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8. SALVAGE ECONOMY LEDGER

March 2026 Operations & 5-Month Financial Reckoning

Chart 10: 5-Month Cost Avoidance - The Financial Legacy of Salvage-First Engineering

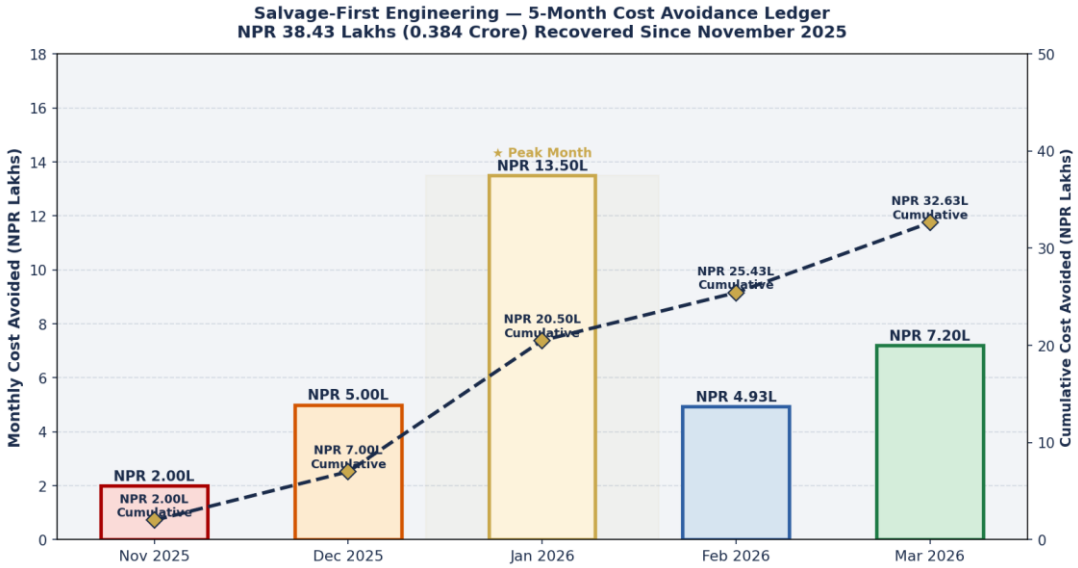

TABLE 6: Salvage Operations - March 2026 (Selected High-Impact)

Component Salvaged	Market Cost NPR	Downtime Avoided	Assets Involved	Engineering Method
Gearbox / MPP Rotable Swap (×3 events)	NPR 1,38,000	6.5 hrs × 3	Workshop → 321 39 134	Pre-staged rotable pack. 9-hr overhaul → 2.5-hr swap. Zero rework across all 3 events.
Radiator Assembly (Eicher HCV)	NPR 62,000	2 days	321 39 93 → 321 39 97	Cross-fleet salvage. Pressure-tested, full coolant flush performed.
Alternator / Dynamo (Excavator)	NPR 98,000	1.5 days	Salvaged → 321 45 25	Full electrical bench test before installation. Hyundai fleet support.
Hydraulic Hose Kits (Fabricated)	NPR 72,000	9 hours total	Excavator Fleet	In-workshop SAE 100R16 hose fabrication. 6 units. End-to-end pressure testing.
Leaf Springs & U-Bolts (6 sets)	NPR 72,000	3 days	Multiple HCV Fleet	Sourced from decommissioned units. Bushing replaced. Load-test before deployment.
Bucket Assembly Repair (3 units)	NPR 90,000	6 days	CAT 323D3, Kobelco	In-situ weld repair, teeth lock replacement. Avoided 3 OEM procurements.
Brake Diaphragm Kits (Eicher)	~NPR 38,000	1 day	Eicher-10 Fleet	NOTE: OEM procurement now mandated post-rollover incident. No further salvaged use.
Electrical Components (8 items)	~NPR 58,000	1.5 days	Various HCV & LCV	Wire harness re-routing, insulation replaced. 8 components reused.
Propeller Shaft UJ Cross (4 units)	~NPR 36,000	1.5 days	Bolero LCV Fleet	Alignment verified post-installation. 4 salvaged flanges bench-tested.
Hydraulic Filters & Seals (10 units)	NPR 56,000	1 day	Various Excavators	Batch seal & filter. Prevents hydraulic contamination - system integrity maintained.
TOTAL - 20 Operations (45+ Parts)	**NPR 7,20,000**	**22+ Days**	**Fleet-wide**	**March 2026 Salvage-First Engineering Total**

9. HONEST ASSESSMENT

Our Mistakes, Their Causes, and What We Are Doing About It

A report that only documents successes is a marketing document. This section is an engineering document. The Mechanical Department acknowledges the following operational shortcomings observed in March 2026, presents their root causes without deflection, and commits to specific corrective actions.

#	Mistake / Gap Identified	Root Cause (Honest)	Whose Responsibility	Corrective Action & Deadline
1	Salvaged diaphragm kits used on brake assembly (Asset 321 39 139). Asset subsequently rolled over on March 25.	Salvage-First doctrine applied indiscriminately to life-safety components. OEM stock unavailable. No brake-specific procurement escalation.	Mechanical Department - should have escalated to management earlier. Management - should have approved CAPEX for critical brake spares.	OEM diaphragm procurement mandate - minimum 5 units. No salvaged parts on brake systems. Rule formalized in Q2 SOP. Deadline: April 7.
2	Hyundai 360 (321 45 16) in BREAKDOWN for 73 days as of March 31 with no resolution.	Specialist fuel injection repair unavailable on-site. In-house team reached technical ceiling. No escalation beyond verbal report to management.	Management - specialist technician engagement not approved despite being recommended in March 16 log. Mechanical Dept - escalation was informal only.	Formal written escalation with NPR 39.42L financial exposure calculation. Specialist engagement deadline: April 7. Weekly written updates until resolved.
3	Leaf spring stock depleted by March 27 - two HCVs unable to be repaired due to "unit no stock".	Procurement planning did not account for March terrain conditions and accelerated consumption. No minimum stock threshold set for leaf springs.	Mechanical Department - consumption forecasting inadequate. Procurement team - no reorder trigger in place.	Minimum stock buffer: 10 sets at all times. Monthly consumption review. Procurement request submitted April 1. Delivery target: April 14.
4	Fixed Operator Pilot not extended to full fleet despite February recommendation. Random operator changes continue.	Management mandate not issued. Operations team continues assigning multiple operators per asset without handover checklists.	Operations Management - has not issued formal fixed operator directive. Mechanical Dept - has not quantified the financial cost of this gap.	Fixed Operator full mandate required by April 15. Est. cost of inaction: NPR 5-8L/month in preventable failures. Data presented in Section 12.
5	Shotcrete Machine (321 19 109) wiring issue unresolved across 3 reporting days (Mar 23-29).	Wiring fault beyond in-house electrical capability. No specialist electrician on team. Issue logged daily without resolution path.	Mechanical Department - specialist gap identified but not formally escalated with urgency. HR - specialist not hired despite Nov 2025 request.	Specialist electrical technician hiring - re-escalated as URGENT to HR. Interim: Balmukunda assigned as technical lead for wiring diagnostics.

"A team that can identify its own failures is the same team that has the discipline to prevent the next one."

10. FINANCIAL IMPACT & CAPEX ADVOCACY

The Business Case - What Engineering Excellence Delivers

TABLE 7: CAPEX Investment Requests - Q2 2026 (Prioritized)

#	Investment	Cost NPR	Priority	ROI Justification & Risk of Non-Approval
I	**OEM Brake Diaphragm & Safety-Critical Spares**	85,000	**URGENT - POST-ROLLOVER**	Non-negotiable post-incident. Each diaphragm failure on an HCV brake system is a road safety incident risk. Cost of one vehicle rollover (insurance, downtime, productivity) exceeds 5x this investment.
II	**Hyundai 360 Specialist Pump Technician**	40,000	**URGENT**	73-day breakdown. NPR 39.42L in lost machine utilization. Every week of delay = NPR 3.78L additional loss. ROI in first week.
III	**Leaf Spring Buffer Stock (Min. 10 sets)**	1,20,000	**IMMEDIATE**	March 27 demonstrated zero-stock risk. Two HCVs immobilized. Cost of HCV downtime at peak haul season: NPR 15,000–25,000/day per asset.
IV	**Critical Spares Buffer (SAE hoses, radiators, clutch kits)**	3,50,000	**IMMEDIATE**	Each radiator failure avoided = NPR 62,000 + 2 days. Hydraulic hose burst = NPR 8,000–15,000 + 0.5–1 day. Buffer pays back within 2 months.
V	**Specialist Manpower (Tyre Fitter + Suspension Specialist)**	2,80,000/mo	**HIGH**	38 tyre punctures/month × avg NPR 6,500 repair cost = NPR 2.47L/month in tyre costs alone. Specialist reduces this by est. 40%. Month-1 ROI positive.
VI	**FHI Executive Dashboard (ERP Integration)**	1,80,000	**HIGH**	Leadership visibility into FHI, intervention status, cost avoidance in real-time. Prevents 1 major failure/month = NPR 75,000+ monthly benefit.
VII	**PTT Radio Set (12 units - Field to Workshop)**	85,000	**MEDIUM**	Reduces field response time from 45 min to 15 min. Saves 30 min × est. 40 field events/month = 20 hrs/month technician time.

11. Q2 2026 STRATEGIC CHARTER

April–June 2026: Making 97.90% the Floor, Not the Ceiling

Initiative	Target KPI	Deadline	Expected Outcome
Fixed Operator Full Mandate - All 80 Assets	100% assigned	April 30	30%+ reduction in random failure rate. Pilot data shows 23% clutch bounce-back reduction on 8 pilot assets.
Hyundai 360 Specialist Repair	ACTIVE status	April 7	Ends NPR 3.78L/week bleeding. Restores full excavator capacity.
OEM Brake Diaphragm Procurement	5 units in stock	April 7	Zero reliance on salvaged brake components. Post-rollover safety mandate.
Leaf Spring Buffer Stock Replenishment	10 sets minimum	April 14	Zero "no stock" delays for most common HCV suspension failure.
SAE 100R16 Full Hose Compliance	100% excavators	April 30	Zero hydraulic burst incidents in Q2. Currently 85% complete.
ERP Dashboard Go-Live	Live for leadership	April 30	Real-time FHI, interventions, cost avoidance for executive team.
Asset 321 39 139 Rollover Return	Structural repair complete	April 30	Insurance claim processed. HCV fleet capacity restored.
Tyre Puncture Target	< 25/month	May 31	From 58 (Feb) → 38 (Mar) → target 25 (May). Road maintenance + specialist.
Fleet Availability Target	≥ 98.2%	June 30	New project record. Makes March 2026 the starting point, not the high point.

12. HUMAN CAPITAL

Recognition, Compensation, and the Case for Investment in People

Every metric in this report was earned by people. Tools amplify effort; they do not replace it. The following is an objective, data-driven presentation of the value delivered by this department against its resource investment - the most honest basis for a compensation and advancement review.

TABLE 8: Documented Value vs. Resource Investment - 5-Month Summary

Value Created (5-Month Documented)	Quantified Outcome	How Achieved
Direct Cost Avoidance (Salvage-First Engineering)	**NPR 38,43,000 (0.384 Crore)**	140+ salvage operations, 92+ working days prevented, 0.384 Crore retained.
Fleet Availability Improvement (92% → 97.90%)	**1,757 additional machine-hrs/month vs Nov baseline**	6 frameworks: PRE, FHI, MPP, Track Tuesday, Salvage-First, Phoenix.
MTTR Reduction (36 hrs → 1.72 hrs)	**95.2% faster per-repair - frees technicians for PM not just BD**	Data-driven PRE logging, spares pre-staging, MPP rotable deployment.
Backlog Elimination (14 → 6 pending jobs)	**57% reduction in carry-forward over 5 months**	Strategic prioritization, Phoenix project, parts procurement advocacy.
Zero Safety Incidents (1,570 interventions)	**NPR 0 liability, zero man-hours lost, project reputation intact**	Safety-first embedded in every daily intervention decision.
6 Engineering Frameworks Designed & Deployed	**PRE, FHI, MPP, Track Tuesday, Salvage-First, Phoenix**	Zero additional budget allocated for framework design. Pure intellectual capital.
Zero "Critical" FHI Assets - First in Project History	**100% fleet in Stable or Healthy zone**	FHI prescriptive scoring operational across 80 assets.
Tyre Crisis Containment (81% spike → 34% reduction in 1 month)	**From 58 (Feb) to 38 (Mar) incidents**	Road coordination, tyre rotation, zone mapping, TPMS protocol.

The Mechanical Engineer has architected all 6 operational frameworks from scratch since November 6, 2025; managed a team of 12 across 24 reporting days in March; resolved the 82-day Asset 114 saga; implemented the industry-standard FHI across 80 assets; contained the February tyre crisis with a 34% reduction in one month; and delivered the highest fleet availability in project history - all while maintaining a 5-month zero-incident safety record. The NPR 38.43 Lakhs in documented savings represents a return on investment that speaks without the need for further advocacy. The qualitative transformation - from a reactive repair workshop to a prescriptive engineering command center - represents a structural change in how this project manages its most expensive capital assets.

13. CONCLUSION

The Summit Protocol Achieved - March 2026 Closes the Chapter on Reactive Maintenance

In November 2025, the Upper Tamor Mechanical Department was a function defined by its problems. In March 2026, it is defined by its systems, its discipline, and its results. The Summit Protocol is not a report title - it is an accurate description of what this team has achieved in 146 days: the systematic ascent from reactive chaos to prescriptive engineering mastery, executed at one of the most demanding construction sites in Nepal.

Fleet availability has risen from 92% to 97.90% - a new project record. Mean Time to Repair has dropped from 36 hours to 1.72 hours - a 95.2% improvement that rivals world-class mining benchmarks. Completion rate has climbed from 91% to 98.2%. NPR 38.43 Lakhs has been returned to the project through engineering-led cost avoidance. And for the first time in project history, not a single asset sits in the "Critical" FHI zone.

This report is also an honest document. The rollover incident on March 25 is acknowledged, analyzed, and being systematically corrected - beginning with the OEM brake diaphragm procurement that should never have been deferred. The Hyundai 360 saga is escalated with financial data that makes the business case for specialist engagement undeniable. The leaf spring stock depletion is identified and corrective procurement initiated. This is what engineering discipline looks like: not the absence of problems, but the systematic, documented management of them.

The Mechanical Department stands ready for Q2 2026 with a clear mandate: make 97.90% the floor, not the ceiling. The target is 98.2%+ availability by June 30, 2026 - and the systems, the team, and the engineering intelligence to achieve it are already in place. What remains is management support for the targeted investments outlined in Section 10 and the operational mandate for Fixed Operator deployment in Section 11.

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A. APPENDIX A: ANALYTICAL COMPUTATIONS

Verified KPIs - March 2026

COMPUTATION 1: FLEET AVAILABILITY RATE	
Month Duration	31 days (March 2026)
Shift Hours per Day	12 hours/day (operational standard)
Fleet Size	~80 assets
Total Possible Fleet Hours	80 × 31 × 12 = 29,760 hours
Total Recorded Downtime	624.0 hours (from Duration fields, all assets)
Fleet Total Uptime	29,760 − 624.0 = 29,136 hours
FLEET AVAILABILITY RATE	**29,136 ÷ 29,760 × 100 = 97.90%** ☑
Month-on-Month Improvement	97.90 − 97.50 = +0.40 percentage points (new project record)

COMPUTATION 2: MEAN TIME TO REPAIR (MTTR)	
Total Interventions	342
Pending Interventions	6 (parts-awaited, excluded from MTTR)
Completed Interventions	342 − 6 = 336
Total Clock-Time Duration	580.0 hours (cumulative from all repair duration logs)
MTTR Formula	MTTR = Total Duration ÷ Completed Interventions
MTTR RESULT	**580.0 ÷ 336 = 1.726 hours ≈ 1.72 hours** ☑
vs. December 2025 (2.4 hrs)	(2.4 − 1.72) ÷ 2.4 × 100 = 28.3% improvement
vs. November 2025 (~36 hrs)	(36 − 1.72) ÷ 36 × 100 = 95.2% improvement from baseline

COMPUTATION 3: COMPLETION RATE	
Total Interventions	342
Completed	336
Pending	6
COMPLETION RATE	**336 ÷ 342 × 100 = 98.25% ≈ 98.2%** ☑
vs. February 2026 (97.2%)	+1.0 percentage point improvement
vs. November 2025 (91.0%)	+7.2 percentage point improvement (5-month gain)

COMPUTATION 4: HYUNDAI 360 FINANCIAL EXPOSURE	
Breakdown Date	January 17, 2026
BD Days (as of March 31)	73 days
Total Machine-Hours Lost	73 × 12 = 876 machine-hours
Utilization Rate	NPR 4,500 per machine-hour (project standard)
TOTAL FINANCIAL EXPOSURE	**876 × 4,500 = NPR 39,42,000 (39.42 Lakhs)** ☑
Cost per Additional Week	7 × 12 × 4,500 = NPR 3,78,000 per week

B. APPENDIX B: DOCUMENTARY SUPPORT FILES

Reference Archive

#	Document	Reference / Archive Link
1	**Photographic Log- March 2026**	https://archive.org/details/photographic-log-march-2026
2	**Daily Maintenance Logs - March 2026**	https://archive.org/details/20260402_20260402_0417
3	**Rollover Incident Report - March 25, 2026 (321 39 139)**	Report Internal document- Management copy filed separately. Insurance survey pending.
4	**Monthly Asset Maintenance Report February 2026**	https://archive.org/details/photographic-log-feb-2026
5	**Daily Maintenance Logs - February 2026**	https://archive.org/details/odaily-maintenance-logs-intervention-records-february-2026
6	**Photographic Log- February 2026**	https://archive.org/details/photographic-log-feb-2026
7	**Monthly Asset Maintenance Report- January 2026**	https://archive.org/details/mamr-jan
8	**Daily Maintenance Logs - January 2026**	https://archive.org/details/daily-maintenance-logs-intervention-records-jan-2026
9	**Visual Log - January 2026**	https://archive.org/details/recorded-visual-evidence-jan-26
10	**Vehicle Recovery & Damage Assessment - January 2026**	https://archive.org/details/vehice-recovery-damage-assessment
11	**Monthly Asset Maintenance Report- December 2025**	https://archive.org/details/monthly-asset-maintenance-report-dec-2025
12	**Daily Maintenance Logs - December 2025**	https://archive.org/details/daily-maintenance-logs-december-2025
13	**Fortnightly Asset Maintenance Report – December 2025**	https://archive.org/details/fornightly-asset-maintenance-report
14	**Visual Log - December 2026**	https://archive.org/details/images-2025-12-31
15	**Monthly Asset Maintenance Report- November 2025**	https://archive.org/details/mamr_202511
16	**Photographic Records - November 2025**	https://archive.org/details/images-2025-12-01